Delivering Diabetes Education Over the Internet: II. Clinical Impact

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INTRODUCTION

There is a very strong rationale for enhancing diabetes education: Recent studies demonstrate a reduction in the complications of diabetes through optimal glycemic control[1].

Patient education is an important component of diabetes management[2], but in many States, including Iowa, diabetes educators are not readily available in many communities.

Expanding access to diabetes education over the Internet offers a potential means of providing ongoing diabetes education to large numbers of people. We examined the effect of providing Internet access, specialized resources, training, and support to adult subjects with diabetes on diabetes knowledge and a physiologic marker of glycemic control, hemoglobin A1c (HA1c).

METHODS

Thirty adult subjects (15 women)—ranging in age from 19 to 83 years (mean 51), managed in a rural setting, with known type 1 or type 2 diabetes, and matched for gender and body mass index (BMI)—were randomly assigned to either receive (group I) or not receive (group II) an iMac computer with Internet access for 3 months. A specially designed Web site with diabetes education, links, e-mail connection to other patients, participating providers, and technical support, as well as a threaded discussion forum, was made available to the subjects randomized to receive Internet training. Training was provided to patients before starting Internet-based education. After 3 months, subjects crossed over to the opposite assignment. Diabetes knowledge tests consisting of 40 multiple-choice questions were administered, HA1c was measured, and weight and BMI were determined before, at crossover, and at the end of the study.

RESULTS

Three months of Internet availability resulted in a modest improvement in knowledge scores compared with the control group initially assigned to non-use (mean±SEM: 6.49±0.47 percent, N=14 compared with –1.75±1.43, N=8, respectively; $P<0.05$). Also, among individual subjects, scores improved after Internet use compared with pre-use scores (mean±SEM: 77.8±2.2 compared with 71.6±3.0, $P<0.005$, N=22). However, there was no significant improvement in HA1c values as a result of Internet availability and no correlation between change in knowledge test scores and change in HA1c. Mean±SEM HA1c values at prerandomization, post-initial randomization (3 months), and post-crossover (6 months) were 7.88±0.66, 7.59±0.45, and 8.14±0.53, respectively, in group I (N=14) and 7.81±0.53, 8.03±0.59, and 7.48±0.35, respectively, in group II (N=14). There was a significant positive correlation ($P<0.001$, $r^2=0.59$) between improvement in HA1c before and after Internet availability and initial (prerandomization) HA1c levels.

CONCLUSIONS

Diabetes knowledge improved modestly as a result of random assignment to Internet

availability, including a Web site focused on diabetes education. There was no statistically significant improvement in glycemic control associated with the incremental knowledge. This may suggest that more intense methods for computer-assisted instruction, beyond availability per se, may be required (information prescription). Alternatively, the current study may have lacked power to detect a significant improvement in HA1c, particularly among those subjects in poor control at study initiation. Additional studies of larger populations with diabetes, focusing on patients with poor control and carried out over a longer duration (and intensity), may be necessary to completely characterize the impact of Internet access on diabetes education.

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